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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
AUDET, MAURY A	

ART UNIT	PAPER NUMBER
1654	6

DATE MAILED: 11/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	09/973,385	SOLTZ ET AL.	
	Examiner	Art Unit	
	Maury Audet	1654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,7 and 12-22* is/are pending in the application.

4a) Of the above claim(s) *8-11* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4, 7 and 12-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment and Arguments

This action is responsive to the response filed August 21, 2003. Claims 1, 3, 4, 7, and new claims12-22 are pending. Claims 2, 5, and 6 are canceled.

Objections

Claim 13 is objected to because of the following informalities:

Use of the term "said" in line 3 of claim 13 is grammatically incorrect and needs to be deleted.

Appropriate correction is required.

Claim Rejections - 35 USC § 112 New Matter

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3, 13 and 14 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Specifically, it was not found in the specification where support for "at least equal to 300 mg/ml" and "but less than 800 mg/ml" may be found. The specification describes

"concentrations ranging from 300 mg/ml [] to 800 mg/ml" (page 3, lines 6-7). It is suggested that the claims be amended to "said material being 300 mg/ml to 800 mg/ml", the range which the specification describes as the derivatized collagen concentration.

Claims 1, 3, 4, 7, and 12-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Specifically, it was not found in the specification where support for a first and second material, as in the manner claimed; or a mesh structure now being a material as well as being encapsulated in a material. The amended claims have confused the subject matter of the invention (particularly two materials, etc.) and clear support could not be readily found.

Claim Rejections - 35 USC § 112

The rejections of original claims 1-20, as well as new rejections, under 35 U.S.C. 112, first paragraph, are each addressed below.

a. The rejection of claims 1, 2 and 4, for lack of enablement for any mesh structures, is withdrawn based on applicant's amendment of claim 1 and 4 (and cancellation of claim 2).

b. The rejection of claims 1 and 4, for lack of enablement for any polymer, is withdrawn based on applicant's amendment of claim 1 and 4.

c. The rejection of claims 3, and 5-7, for lack of enablement for any structural component, is maintained for the reasons of record. Applicant's arguments (and amendments to claims 3 and 7, and cancellation of claims 5 and 6) have been fully considered but they are not persuasive. Although Applicant has amended the claim to cancel "structural component" and more concisely define what is in the tissue adhesive patch, it is still unclear what "fibers" are contemplated for use therein. As stated on page 4-5 of the first Action, "the specification only teaches "collagen" fibers (p. 16, last ¶). It is suggested that Applicant amend the claim to recite "collagen" fibers.

d. Claims 1, 3, 4, 6-7, and new claims12-22 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for derivatizing collagen with sulfonyl/thiol (SH-) and carboxyl (COO-) "functional groups", does not reasonably provide enablement for derivatizing collagen with any and all "functional groups". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Specification page 9 (and generally throughout the specification) reasonably describes that "[d]erivatization was intended to provide functional groups to enhance both cohesive (SH-, thiol) and adhesive (COO-) characteristics", and that these specific "functional groups" were selected for their respective derivatizing qualities (i.e. SH- for cohesive strength; COO- for adhesive strength). However, the specification does not describe that any other functional groups could replace the two described "functional groups" (SH-; COO-) and produce a derivatized collagen capable of the cohesive and adhesive strength necessary to make the invention work. Applicant has not enabled such a broad scope.

Ellis et al. (1999) list 41 organic functional groups (Table 1) which are capable of reacting with proteins such as collagen, under the right conditions. As broadly claimed, the present invention as claimed, encompasses any one of Ellis et al.'s 41 organic functional groups. However, it is unpredictable whether even one of these could replace the "functional groups" described in the present specification. Furthermore, as Wallace et al. teach at column 31, lines 1-9, it took more than 100 hours of hydration in the study of simulated in vivo analysis of derivatized collagen to postulate that "weakening of bond strength was *thought* to be due to hydrolysis of carboxyl -ester and thio-ester (FIG. 13) network linkages. COH102 is a glutaryl-succinimidyl ester; even after reaction with the terminal carboxyl of the succinimidyl ester, there remains a carboxyl ester linking the glutaryl moiety to the main PEG chain; this bond, as well as the thio-ester bond, could hydrolyze" (emphasis added in original). Assuming it may only be possible to determine "functional group" bond strength by similar tests, the amount of time and effort to determine whether other "functional groups" could work in the invention would involve undue experimentation. Thus, determining whether any and all functional groups could elicit tissue cohesion and adhesion qualities, the two qualities described in the specification as essential to the invention's functionality, would require undue experimentation without a reasonable expectation of success by one of skill in the art.

It is suggested that Applicant amend the claims to incorporate that the collagen is derivatized with a functional group selected from the group consisting of COO- or SH-, the only "functional groups" described in the specification for derivatizing collagen.

Claim Rejections - 35 USC § 112 2nd

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3, 4, 6-7, and new claims12-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. The rejection of claim 1 is withdrawn based on applicant's amendment of claim 1.

b. The rejection of claim 3 is maintained for the reasons of record. Applicant's arguments have been fully considered but they are not persuasive. Applicant has still not addressed or defined what is meant by "material" (i.e. the substance/other substances that make up the "material").

c. The rejection of claim 3 (and depending claim 7) is maintained for the reasons of record. Applicant's arguments have been fully considered but they are not persuasive. Although Applicant has amended the claim to cancel "structural component" and more concisely define what is in the tissue adhesive patch, it is still unclear what "fibers" are contemplated for use therein. As stated on page 4-5 of the first Action, "the specification only teaches "collagen" fibers (p. 16, last ¶). It is suggested that Applicant amend the claim to recite "collagen" fibers.

d. The rejection of claim 4 is withdrawn based on applicant's amendment of claim 4.

e. The rejection of claim 5 is withdrawn based on applicant's cancellation of claim 5.

f. The rejection of claim 5 is withdrawn based on applicant's cancellation of claim 5.

g. In claims 1, 3, 13 and 14 the phrasing "a concentration of said derivatized collagen" is unclear, since the derivatized collagen is obviously present at some concentration. The derivatized collagen and its "concentration" are necessarily one in the same and "a

concentration" has antecedent basis for this reason. For clarity, it is suggested that the phrase "a concentration" be amended to read "wherein the concentration of said derivatized collagen". The rejection of claims 1-20 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, are each addressed below.

h. In claims 1, 3, 13, and 14, it is unclear what is contemplated within the meaning of "derivatized" collagen. Applicant has not stated what the collagen has been derivatized with or where within the molecule. It is suggested that Applicant amend the claims to incorporate that the collagen is derivatized with a functional group selected from the group consisting of COO- or SH-, the only "functional groups" described in the specification for derivatizing collagen (i.e. incorporate claims 15-22 into the independent claims).

i. In claims 1, 3, 13, and 14, it is unclear what is meant by "at least equal to 300 mg/ml" and "but less than 800 mg/ml". The specification describes "concentrations ranging from 300 mg/ml [] to 800 mg/ml" (page 3, lines 6-7). It is suggested that the claims be amended to "said material being 300 mg/ml to 800 mg/ml", the range which the specification describes as the derivatized collagen concentration.

j. In claim 13, it is unclear what constitutes the "material". Specification page 7-8 , while indirectly indicating that deionized water, pepsin (removed though in Step. 11), and NaCl may constitute a portion of the material, which the derivatized collagen is concentrated within; the claim language does not even disclose to the public whether deionized water and NaCl are even in the end-product 'material', or if they have been essentially filtered out as well, leaving only concentrated derivatized collagen as the 'material'. As claimed, any material that could

include/comprise the derivatized collagen and encapsulated mesh structure, is within the scope of the claims, and it is therefore unclear as to what constitutes 'material'.

Claim Rejections - 35 USC § 102

The rejection of claims 1-3, and 5-6 under § 102(b), as anticipated by Wallace et al. (US 6,495,127B), is withdrawn pursuant to Applicant's amendment of the claims and cancellation of claims 2, 5, and 6.

Claim Rejections - 35 USC § 103

Claims 1, 3, 4, 7, 10, 13-15-22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,495,127B).

Wallace et al. is discussed in the previous action. Although Wallace et al. teach the use of derivatized collagen (column 12, lines 56-57) and collagen at various concentrations (see entire document), Wallace et al. does not expressly teach a concentration of 300 mg/ml to 800 mg/ml (claims 1, 3, 13).

One of ordinary skill in the art at the time the claimed invention was made would have found it prima facie obvious to use any concentration of derivatized collagen in Wallace et al., including between 300 mg/ml to 800 mg/ml, because use of any range of collagen is merely routine optimization of one of skill in the art.

Claims 1, 3, 4, 7, and 12, 13, 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,495,127B) in view of Ding (US 6,547,806) and Shastri et al. (US 6,471,993 B).

As discussed in the previous action, Wallace et al. teach Applicants claims 1-3, and 5-6, by describing that a derivatized collagen (column 12, lines 56-57) within a material (column 11, lines 28-29, 44) may be used in dried sheets or as coating (encapsulating/embedding) for "artificial patches or meshes" [i.e. mesh or structural component] (column 4, lines 10-16 and column 15, line 37-43), wherein a mesh-like core may include a polymer selected from the group consisting of nylon, polyester, or polycarbonate (column 7, line 43-47). Wallace et al. also teach Applicants claims 5-6; wherein a material including derivatized collagen and coating [embedding] artificial patches or meshes [structural component] (column 15, lines 42-43), may also include afibrillar, microfibrillar, and fibrillar collagen [i.e. substantially conductive structural material] (column 10, lines 43-46), and includes collagen fibers [i.e. a plurality of fibers] (column 18, lines 4-8).

Although Wallace et al. teach the use of derivatized collagen (column 12, lines 56-57) and collagen at various concentrations (see entire document), Wallace et al. does not expressly teach a concentration of 300 mg/ml to 800 mg/ml (claims 1, 3, 13). Wallace also does not expressly teach that the fibers are bundled (claim 4) or coaligned (claim 7) or that carbon and wire may be used therein (claim 14).

Ding is discussed in the previous action and teach the use of metal and carbon.

Shastri et al. is discussed in the previous action, and teach coaligned fiber matrices with derivatized collagen that are coaligned (column 13, lines 1-6 and column 5, lines 45-51).

One of ordinary skill in the art at the time the claimed invention was made would have found it prima facie obvious to use any concentration of derivatized collagen in Wallace et al., including between 300 mg/ml to 800 mg/ml, because use of any range of collagen is merely routine optimization of one of skill in the art.

Applicant argued in response to the first action (page 11, lines 4-5) that since Ding and Shastri et al. do not teach the derivatized collagen concentrations generally (i.e. 300-800 mg/ml), that it is not combinable with Wallace et al. and thus is not obvious that Wallace et al. could use carbon or metal in view of Ding (Applicant did not provide proof that Vicyrl is not as least partially conductive, and absent evidence to the contrary, such is maintained), or coaligned fibers in view of Shastri et al. Applicant's arguments have been fully considered but they are not persuasive. The rejection of the claim 7 limitation, of Wallace et al. in view of Shastri et al., that "one of ordinary skill in the art at the time the invention was made would have found it prima facie obvious to use Ding's carbon or metal wire and Shastri et al.'s fiber matrices, where the fibers are aligned along micro voids, in the derivatized collagen-based tissue sealant of Wallace et al., because Ding et al. teach the advantageous use of carbon and metal wire and Shastri et al. teach the advantageous use of fiber and derivatized collagen to engineer tissue which may be used to replace (i.e. seal) injured skin", is maintained.

Furthermore, one of ordinary skill in the art at the time the invention was made would have found it prima facie obvious to instead bundle, rather than coalign the fibers of Wallace et al, because it is merely routine optimization of one of ordinary skill in the art to bundle or package the fibers (the alternative of coalign), since bundling or grouping of the protein collagen fibers is a natural state in which the fibers exist or maintain if not expressly aligned.

Claims 1, 3, 4, 7, and 12, 13, 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wallace et al. (US 6,495,127B), in view of Bentz et al. (US 2003/0095993 A1), Ding (US 6,547,806) and Shastri et al. (US 6,471,993B).

Wallace et al. is discussed above. Although Wallace et al. teach the use of derivatized collagen (column 12, lines 56-57) and collagen at such concentrations 65 mg/ml (column 21, lines 65-66), Wallace et al. does not expressly teach a concentration of 300 mg/ml to 800 mg/ml (claims 1, 3, 13). Wallace also does not expressly teach that the fibers are bundled (claim 4) or coaligned (claim 7).

Ding is discussed above.

Shastri et al. is discussed above.

Bentz et al. teach the heating of denatured collagen to the broad range of 2 mg/ml to 350 mg/ml (¶ 0030) for use in a tissue repair, regeneration and augmentation.

One of ordinary skill in the art at the time the claimed invention was made would have found it prima facie obvious to use any concentration of derivatized collagen in Wallace et al., including between 300 mg/ml to 800 mg/ml, in view of Bentz et al., because Bentz et al. teach the use of a very large range (including between 300 mg/ml and 800 mg/ml)of collagen in concentration, for similar use as Wallace et al., in tissue repair, regeneration and augmentation.

Applicant argued in response to the first action (page 11, lines 4-5) that since Ding and Shastri et al. do not teach the derivatized collagen concentrations generally (i.e. 300-800 mg/ml), that it is not combinable with Wallace et al. and thus is not obvious that Wallace et al. could use Ding's carbon and metal wire or the coaligned fibers in view of Shastri et al. Applicant's

arguments have been fully considered but they are not persuasive. The rejection of the claim 7 limitation, of Wallace et al. in view of Ding and Shastri et al., that "one of ordinary skill in the art at the time the invention was made would have found it prima facie obvious to use Ding's carbon and metal wire and Shastri et al.'s fiber matrices, where the fibers are aligned along micro voids, in the derivatized collagen-based tissue sealant of Wallace et al., because Ding teach the advantageous use of carbon and metal wire and Shastri et al. teach the advantageous use of fiber and derivatized collagen to engineer tissue which may be used to replace (i.e. seal) injured skin", is maintained.

Furthermore, one of ordinary skill in the art at the time the invention was made would have found it prima facie obvious to instead bundle, rather than coalign the fibers of Wallace et al, because it is merely routine optimization of one of ordinary skill in the art to bundle or package the fibers (the alternative of coalign), since bundling or grouping of the protein collagen fibers is a natural state in which the fibers exist or maintain if not expressly aligned.

From the teachings of the references, it is apparent that one of ordinary skill in the art would have had a reasonable expectation of success in producing the claimed invention. Therefore, the invention as a whole was prima facie obvious to one of ordinary skill in the art at the time the invention was made, as evidenced by the references, especially in the absence of evidence to the contrary.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maury Audet whose telephone number is 703-305-5039. The examiner can normally be reached from 7:00 AM – 5:30 PM, off Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brenda Brumback can be reached at 703-306-3220. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-4242 for regular communications and 703-308-1234 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1235.

MA
October 30, 2003

MICHAEL MELLER
PRIMARY EXAMINER